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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/694,782	10/24/2000	Donald Francis Specht	18180.0016	8581

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EXAMINER	
LE, BRIAN Q	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/694,782	Applicant(s) SPECHT ET AL.	
	Examiner Brian Q Le	Art Unit 2623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 February 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *24 October 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment and Arguments

1. Applicant's amendment filed February 04, 2004, has been entered and made of record.

2. Applicant's arguments with regard to claims 1-13 have been fully considered, but are not considered persuasive because of the following reasons:

Applicant's arguments, see page 5, filed February 04, 2004, with respect to the rejection(s)of claim(s) 1 under 35 U.S.C 102(e) have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Chida U.S. Patent No. 5,930,405 since Chida teaches the amended limitation of claim 1.

Thus, the rejections of all of the claims are maintained.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-7 and 11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Loce U.S. Patent No. 6,438,273 and Chida U.S. Patent No. 5,930,405.

Regarding to claim 1, Loce teaches a method of increasing the sharpness (increase resolution) of a source image (Abstract) based on at least on auxiliary, co-registered image of a higher degree of sharpness (template has higher degree of sharpness or better resolution) (column 7, lines 1-9) wherein the source and auxiliary images comprise a plurality of pixels with

corresponding spectral intensities, and wherein the spectral intensities of co-located pixels in the source (column 2, lines 14-19) and one or more auxiliary images define an intensity vector (FIG. 9 and FIG. 11) for each co-located pixel (when a vector stores pixel's data, it is inherent that it would store intensity data of that pixel too) (column 10, lines 6-15), comprising:

Resampling (sampling) the source and the auxiliary image to a common (FIG. 3 and column 8, lines 1-12), lower resolution.

Determining for each source image pixel a gain relating a differential change in intensity in the source image pixel with a differential change in intensity (change in resolution) of a corresponding auxiliary image pixel (column 7, lines 10-15 and column 12, lines 5-12), based on the common, lower resolution, wherein includes the dividing the pixels in the source image and auxiliary image into corresponding pixel groups having a plurality of pixels (FIG. 6 and column 7, lines 64-67);

Deriving a mapping function (column 10, lines 20-28 and table 1) correlating determined gains with corresponding intensity vectors;

Subdividing each pixel of the original source image into a plurality of small pixels (FIG. 6), each small pixel of the original source image corresponding in size and location to a small pixel (FIG. 7) in the auxiliary image (In order to compare with templates, the size and location of input image must be correspond with the template/auxiliary image); and

Modifying the intensity of each subdivided source pixel based on differences in intensities (column 12, lines 5-12) between the small and large pixels in the auxiliary image and an interpolated (calculation of all possible values) gain from the mapping function (column 12, lines 35-44).

However, Loce does not disclose the concept of calculating an average value for each pixel group in the source image and for each corresponding pixel group in the auxiliary image, subtracting the average value from each pixel group to create pixel difference groups, and computing the gain between corresponding pixels of each pixel difference groups, and computing the gain between corresponding pixels of each pixel difference group of the source image and the corresponding pixel difference group of the auxiliary image. Chida teaches the process of improving image's resolution (column 5, lines 57-60) comprising the step of calculating an average/mean value for each pixel group in the source image and for each corresponding pixel group in the auxiliary image (column 10, lines 15-22, Equation 1 represents the mean/average calculation of pixel group of the source image/reference image and equation on column 10, line 65 represents the mean/average calculation of pixel group of the auxiliary image/target block), subtracting the average/mean value from each pixel group to create pixel difference groups, and computing the gain between corresponding pixels of each pixel difference groups (column 9, lines 28-44), and computing the gain (variance calculation) between corresponding pixels of each pixel difference group of the source image and the corresponding pixel difference group of the auxiliary image (column 9, lines 42-44) (For a complete understanding of this entire concept, please look at both columns 9 and 10). Modifying Loce's method of improving image's resolution according to Chida would able to fully analyzing the difference or changes between the source image and the auxiliary image to further improve the resolution of the image. This would improve processing and therefore, it would have been obvious to one of the ordinary skill in the art to modify Loce according to Chida.

For claim 2, Loce further teaches the method wherein each of the large source pixels is subdivided into N x M pixels in the subdividing step (FIG. 6).

Referring to claim 3, Loce discloses the method wherein N is equal to M (FIG. 6, "Window Section").

As for claim 4, Loce further discloses the method wherein N is not equal to M (FIG. 6, "Desired Output Image").

Referring to claim 5, Loce teaches the method wherein the intensity vector includes at least two spectral intensities for each pixel (multiple bit contains more than two spectral intensity) (column 9, lines 9-10).

Regarding claim 6, Loce also teaches the method wherein the deriving step includes creating a codebook relating intensity vectors to at least one corresponding gain value (as disclosed in claim 1) based on the determining step (FIG. 11).

For claim 7, Loce shows the method wherein the creating is performed according to vector quantization (column 12, lines 40-45 and column 10, lines 50-60).

Regarding claim 11, Loce teaches the method wherein the determining, deriving, subdividing and modifying steps are performed based on a plurality of co-located auxiliary images (FIG. 13).

For claim 12, Loce also teaches the method wherein each pixel group comprises N x N pixels (FIG. 5).

Referring to claim 13, Loce further teaches the method wherein N is 2 (FIG. 6, "Desired Filter Output at template location").

5. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Loce U.S. Patent No. 6,438,273 and Chida U.S. Patent No. 5,930,405 as applied to claim 6 above, and further in view of Aleksic U.S. Patent No. 6,317,525.

Regarding claim 8, Loce does not disclose a concept of weighted average of the gain value of pixel intensity. Aleksic teaches a method of enhance the spatial resolution applying the weighted average of the value of pixel intensity (the weighted average of the gain value of the pixel intensity) (column 5, line 67 and column 6, lines 1-8). Modifying Loce's method of enhancing the resolution of the image according to Aleksic would able to compute the average resolution of the displayed pixels. This would improve processing and therefore, it would have been obvious to one of the ordinary skill in the art to modify Loci according to Aleksic.

6. Claims 9-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Loce U.S. Patent No. 6,438,273 and Chida U.S. Patent No. 5,930,405 as applied to claim 6 above, and further in view of Miceli U.S. Patent No. 6,522,284.

Regarding to claim 9, Loce does not teach a neural network has node centers. However, Miceli teaches a method of improving the resolution of the system (column 7, lines 45-67) that has a neural network comprises node centers (column 12, lines 35-53). Modifying Loce's method of enhancing the resolution of the image according to Miceli would able to improve the communication capability of the image resolution enhancement system. This would improve processing and therefore, it would have been obvious to one of the ordinary skill in the art to modify Loci according to Miceli.

For claim 10, Miceli further teaches a probabilistic neural network (column 5, lines 15-25 and column 10, lines 55-67).

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Cited Reference

Pub. No. 2002/0126209 to Yamada, teaches image pick-up apparatus. It also involves average/mean calculation of pixel block.

U.S. Patent No. 6,519,366 to Kaburagi, teaches image processing apparatus, image processing method and memory medium. It also involves average/mean calculation of pixel block.

U.S. Patent No. 6,507,668 to Park, teaches image enhancing apparatus and method of maintaining brightness of input image. It also involves average/mean calculation of pixel block.

Contact Information

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Q Le whose telephone number is 703-305-5083. The examiner can normally be reached on 8:30 A.M - 5:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amelia Au can be reached on 703-308-6604. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

BL
March 23, 2004

SAMIR AHMED
PRIMARY EXAMINER